POLITECNICO DI MILANO

HPPS PROJECT

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AndroBenchmark: high performance computation on android devices

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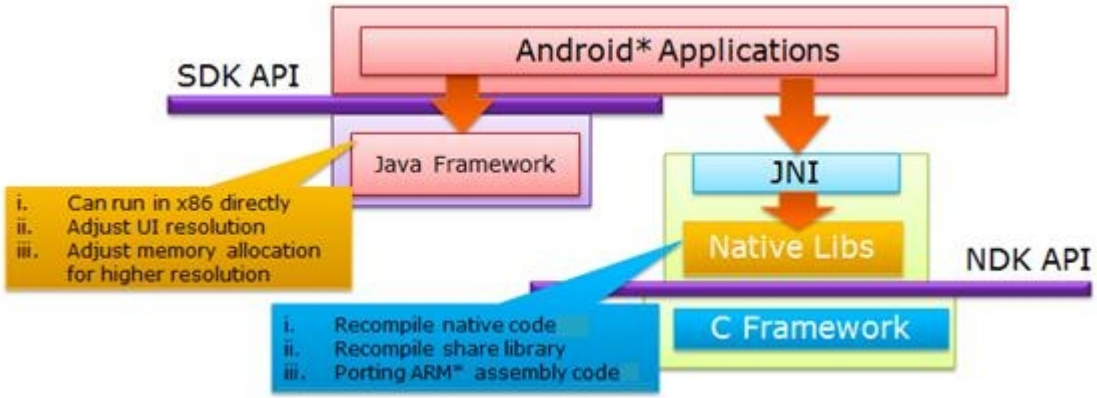
Situation now

- Wide diffusion of mobile devices
- Devices more complex and heterogeneous
- Expectations about app's performance are increasing

How can I obtain high performance from my app?

How can I speed up my app?

Before Android 3.0 → SDK || NDK



*After Android 3.0 → SDK || NDK || **RenderScript***

Who is better?

NDK || RenderScript?

Our project

- *Portability*

- *Performance*

- *Power consumption*

What is NDK? What is RenderScript?

The Technology: NDK and RS

NDK

- Exploits Java Native Interface (JNI)
- C/C++ toolchain with gcc compiler
- App_complexity++
- Portability--

RenderScript

- Heterogeneous parallel computation
- C99 kernels + toolchain with Clang compiler and LLVM
- App_complexity--
  (thanks to Reflected Layer)
- Portability++

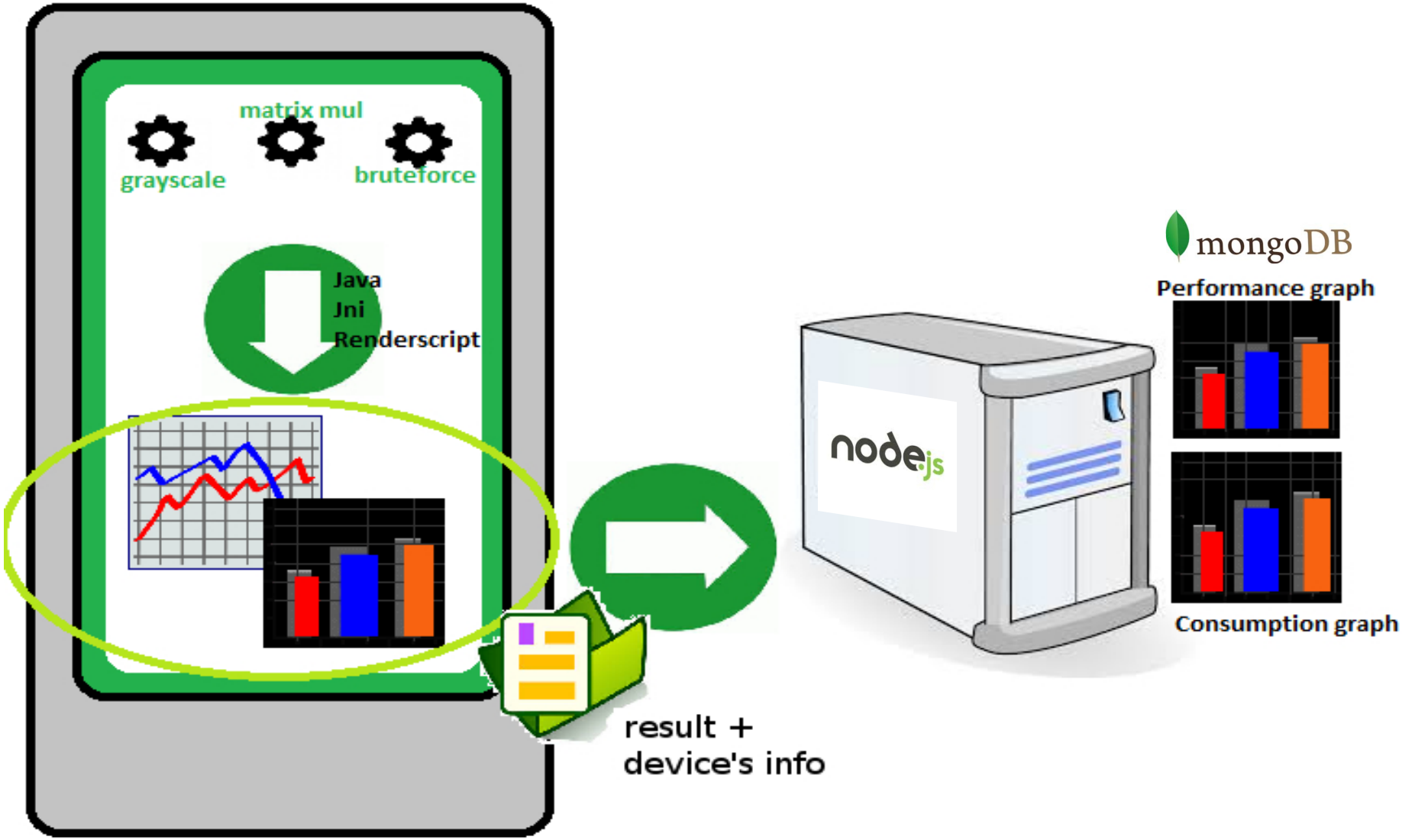
The APP: androBENCHMARK

Analysis of performance
(execution's time in ms)

+

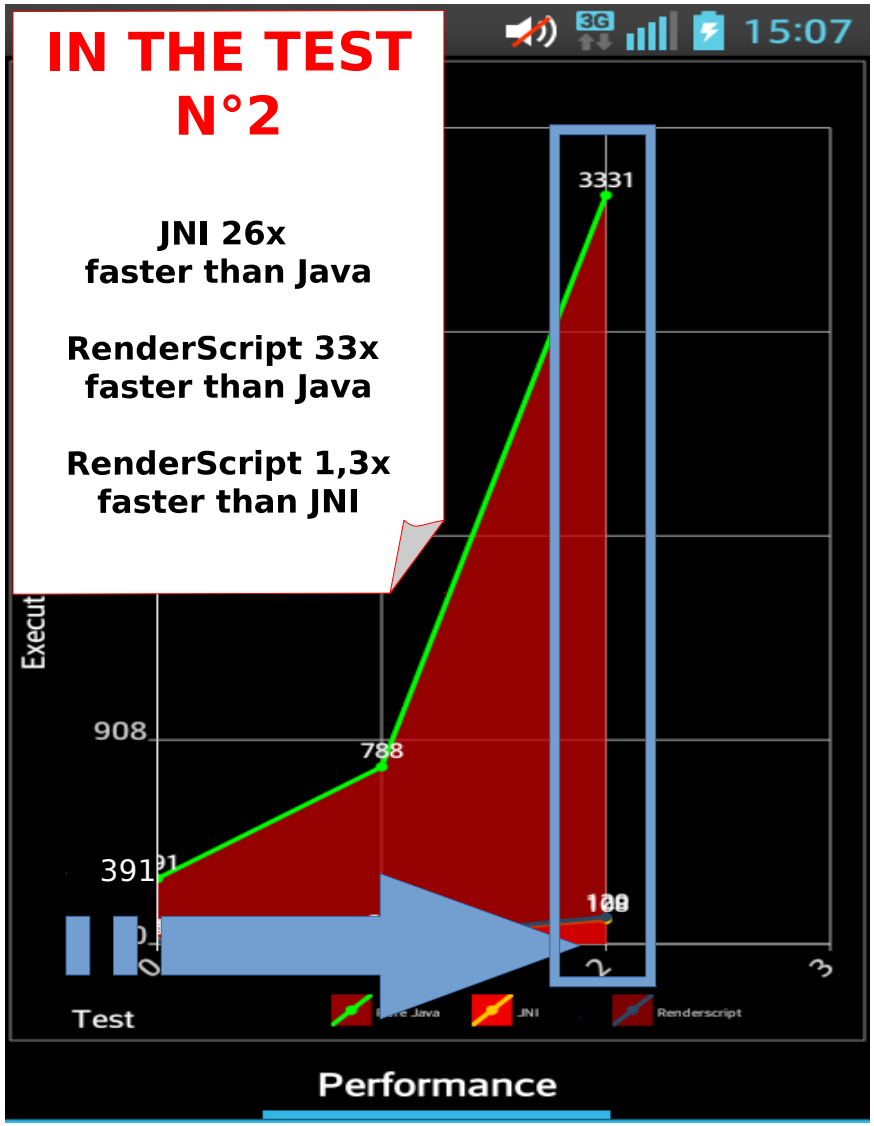
Analysis of resistence
(# of executions on same data to lose 1% of battery)

The APP: androBENCHMARK

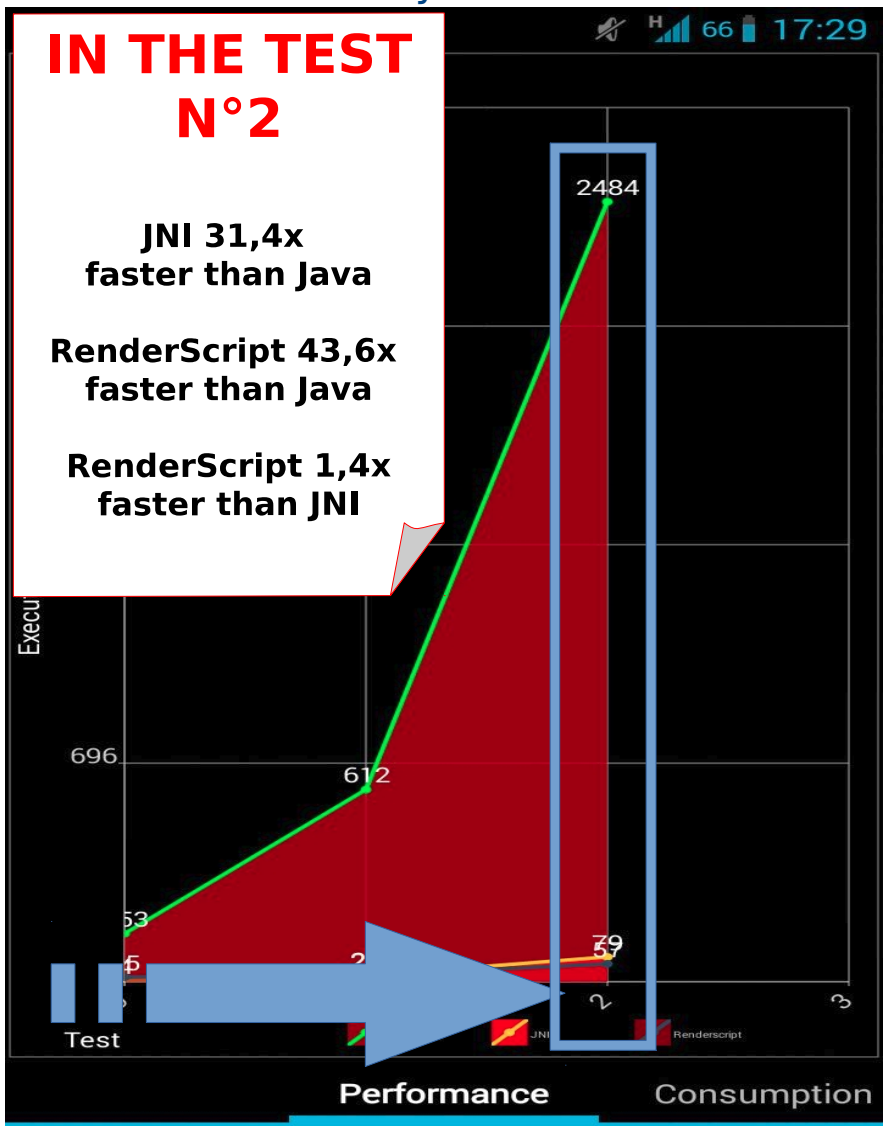


Discussion of local result (Grayscale Performance)

LG L5

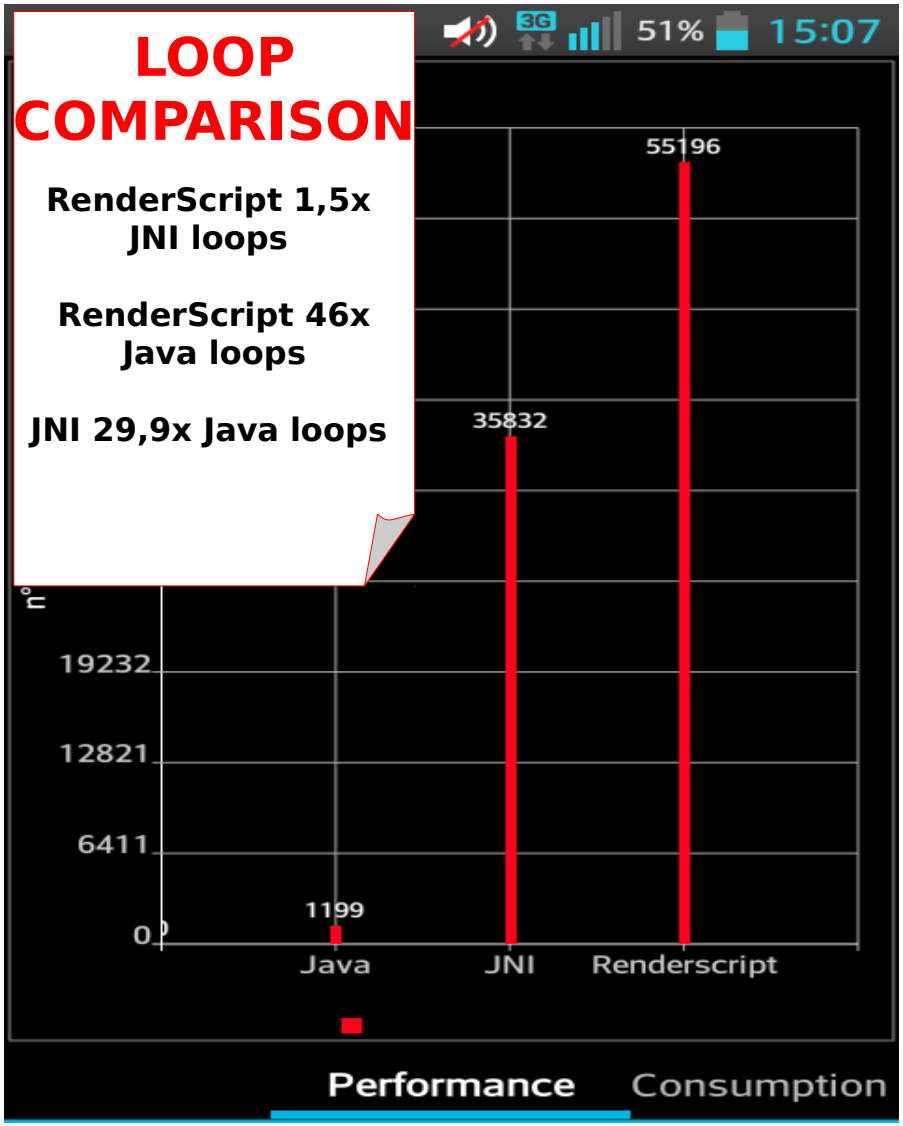


Galaxy SIII



Discussion of local result (Grayscale loops untill lose of 1% battery)

LG L5



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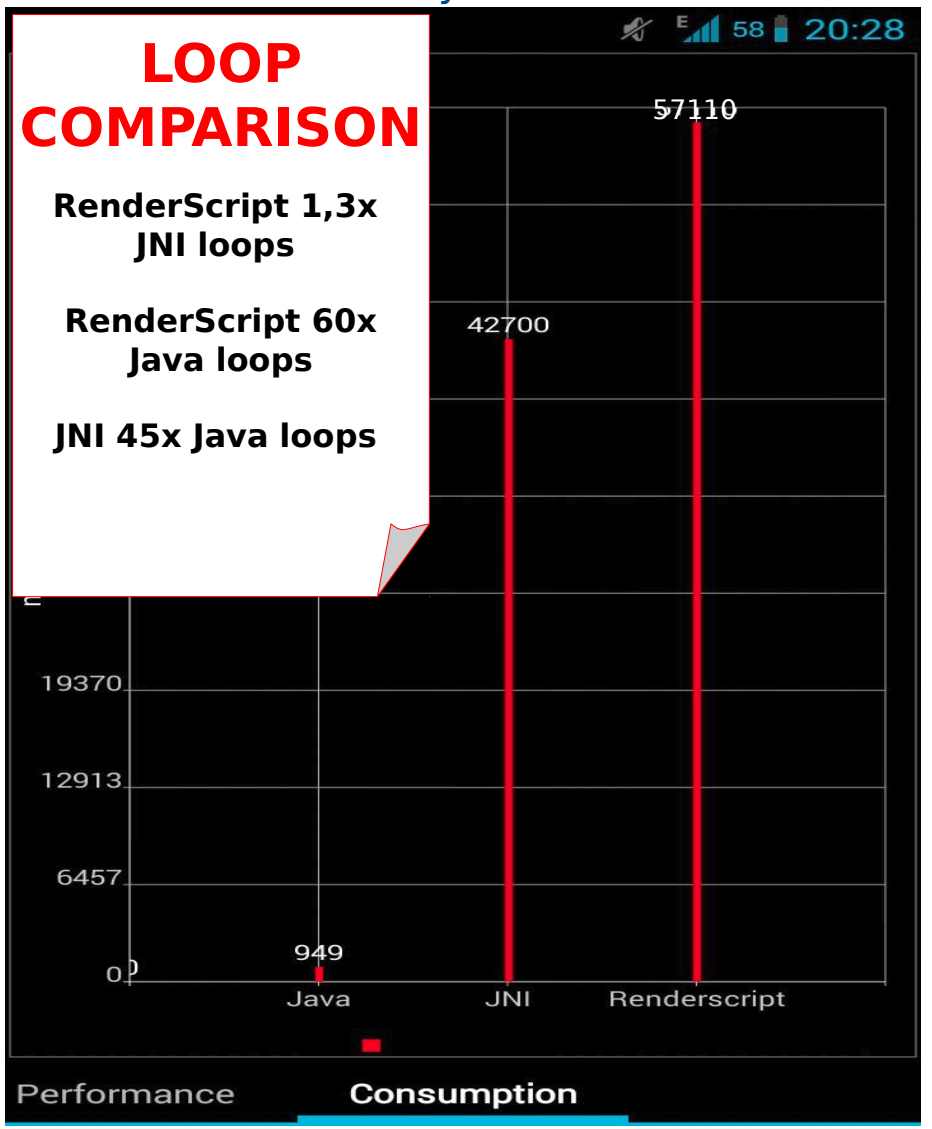
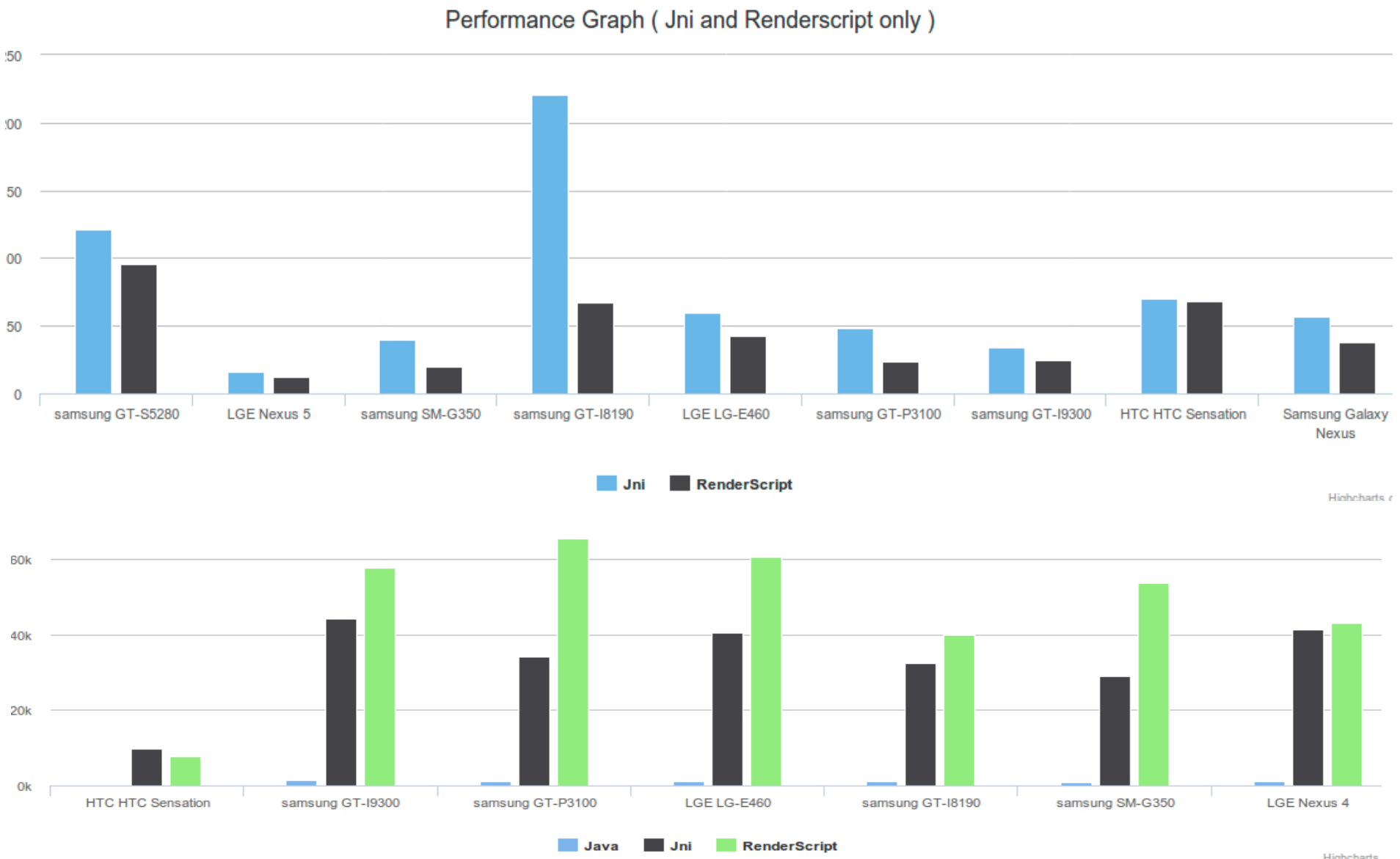
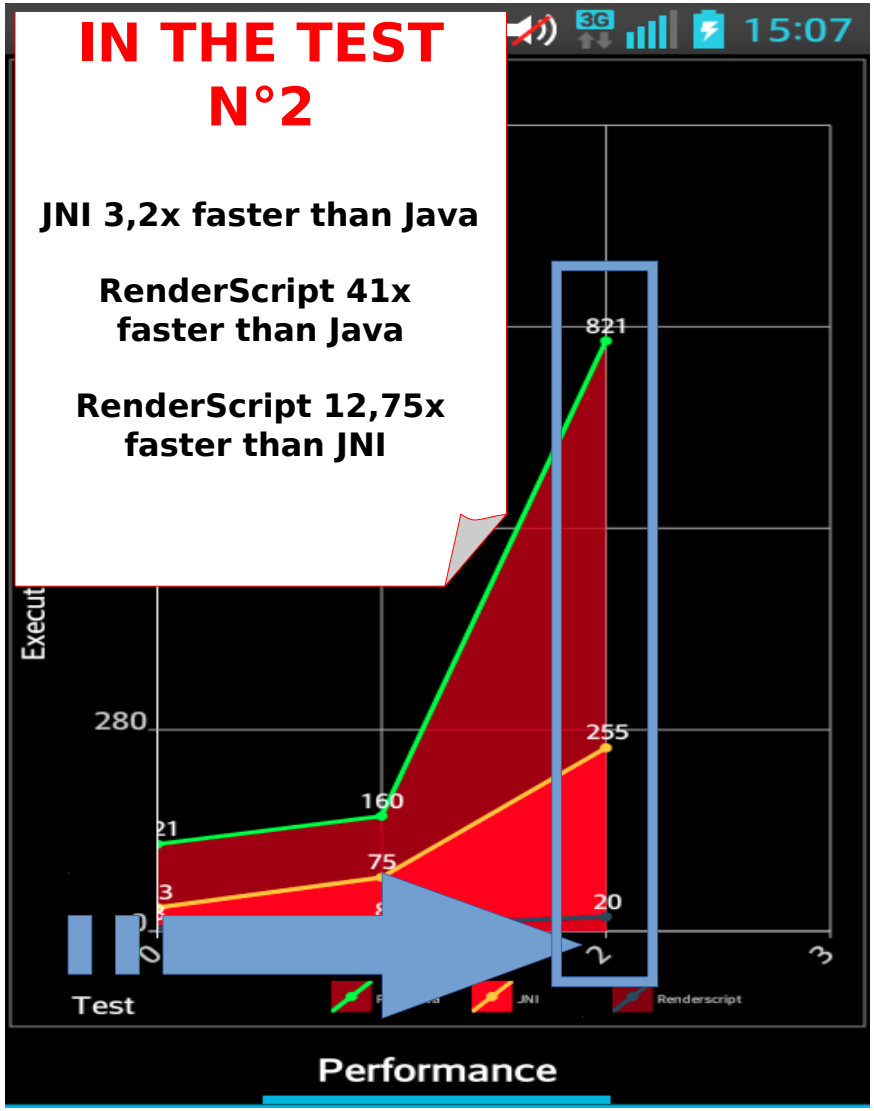


Discussion of global result (Grayscale)

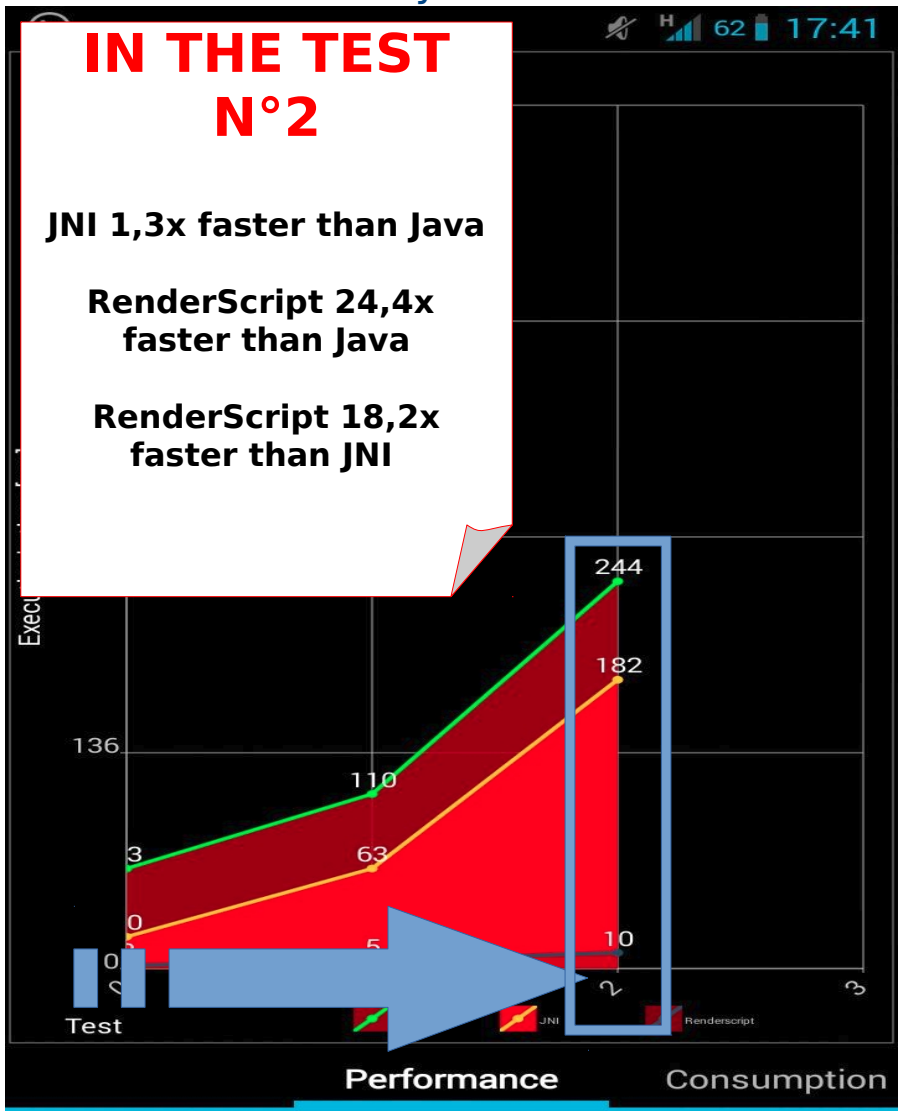


Discussion of local result (Matrix Mult Performance)

LG L5

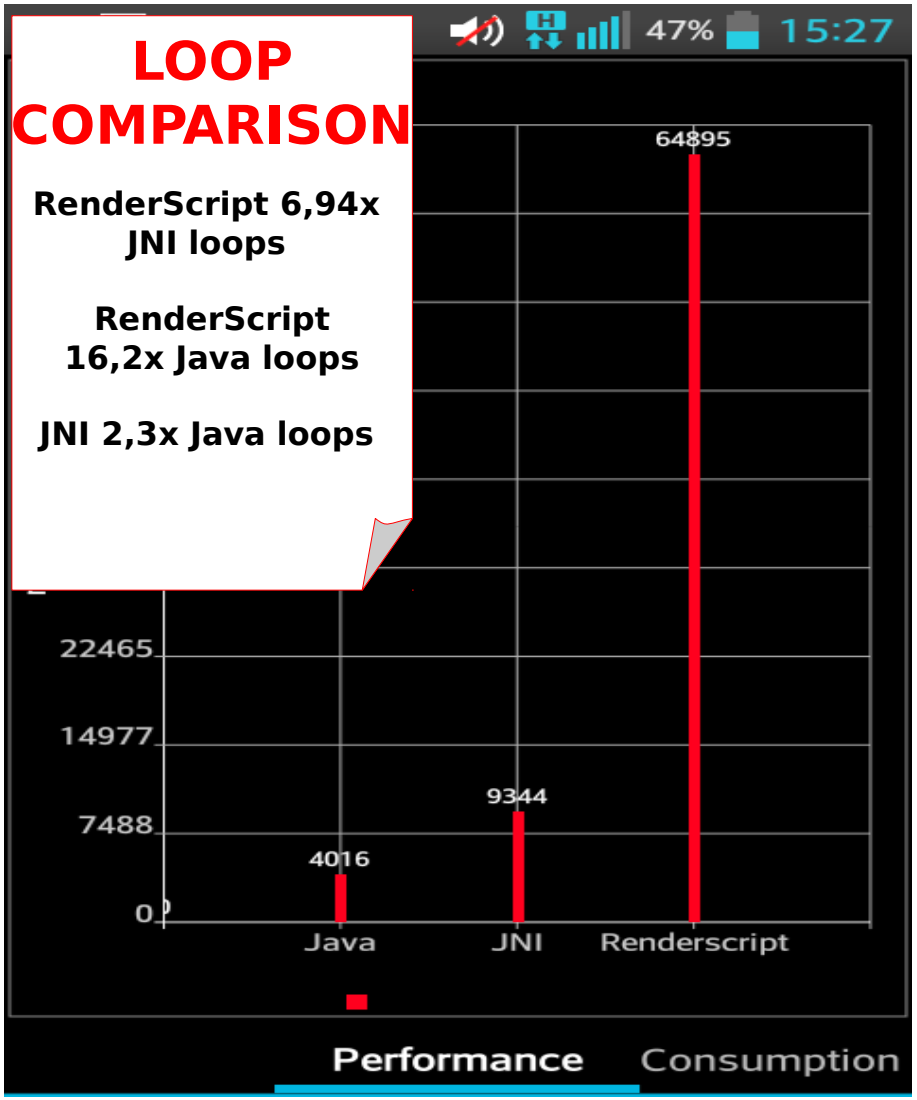


Galaxy SIII



Discussion of local result (Matrix mult loops untill lose of 1% battery)

LG L5



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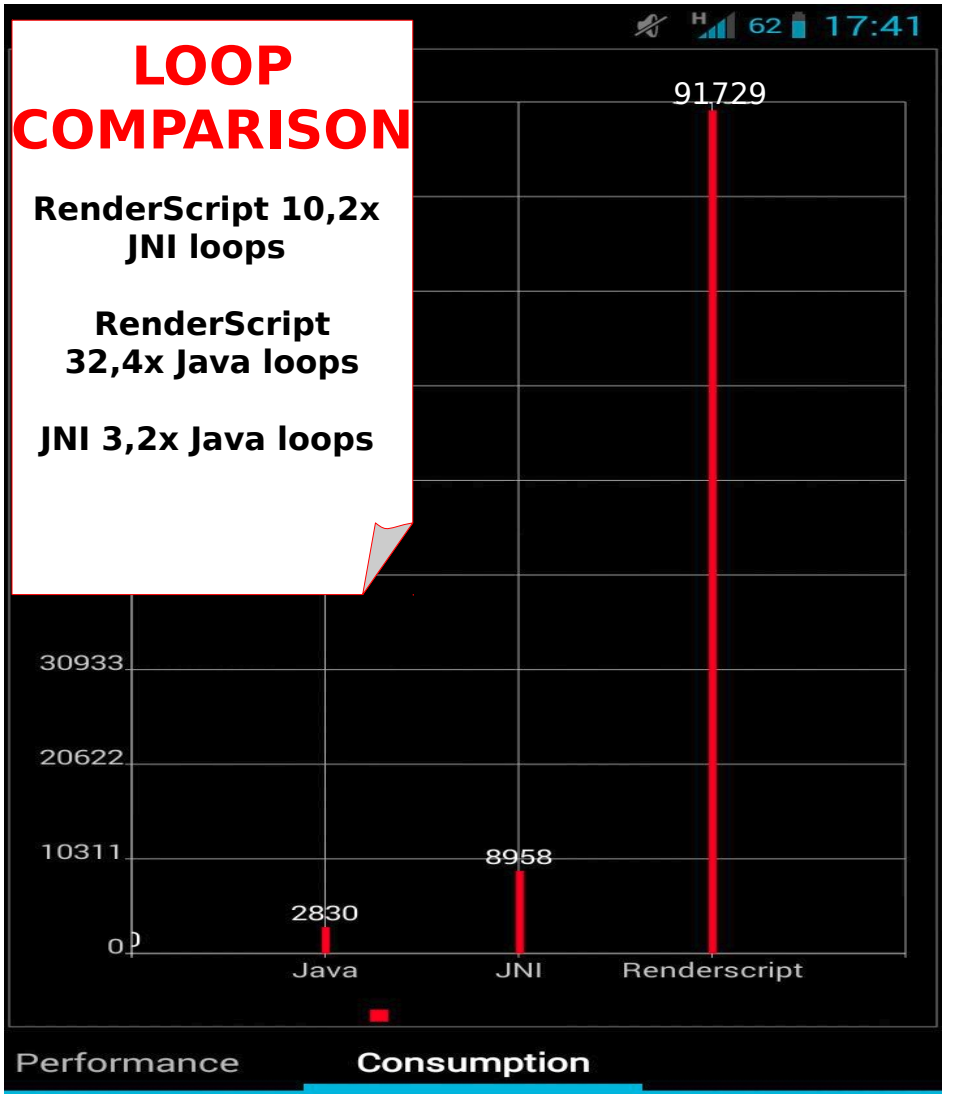
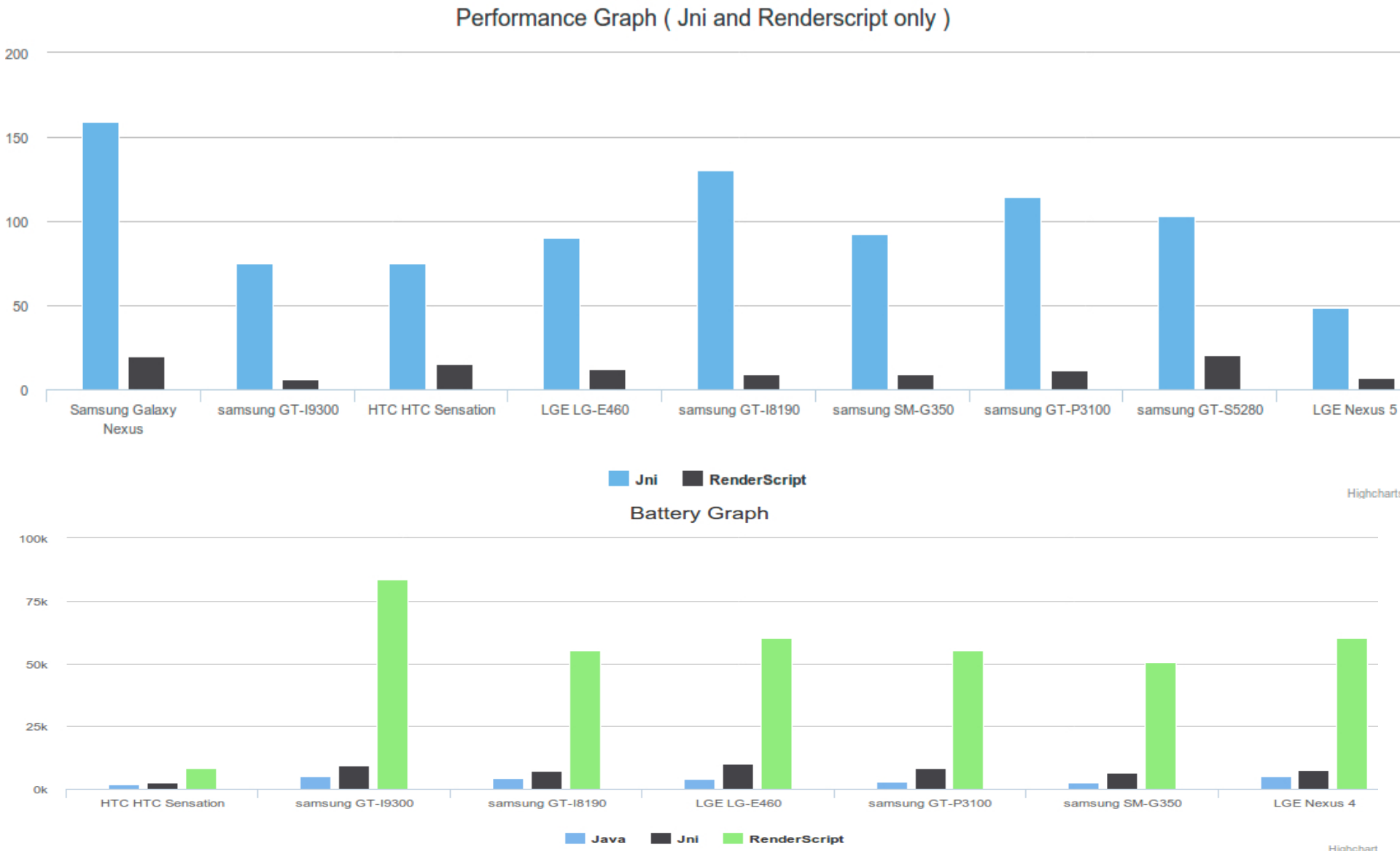
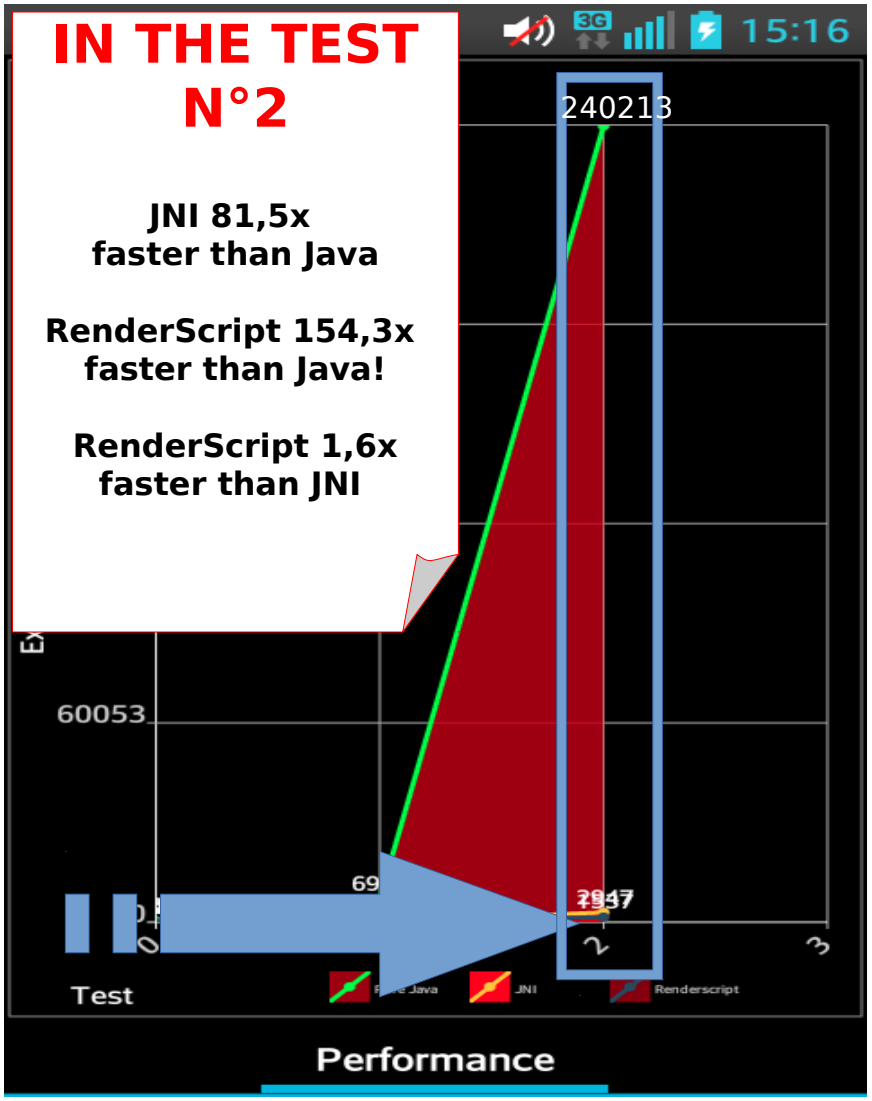


Discussion of global result (Matrix mult)

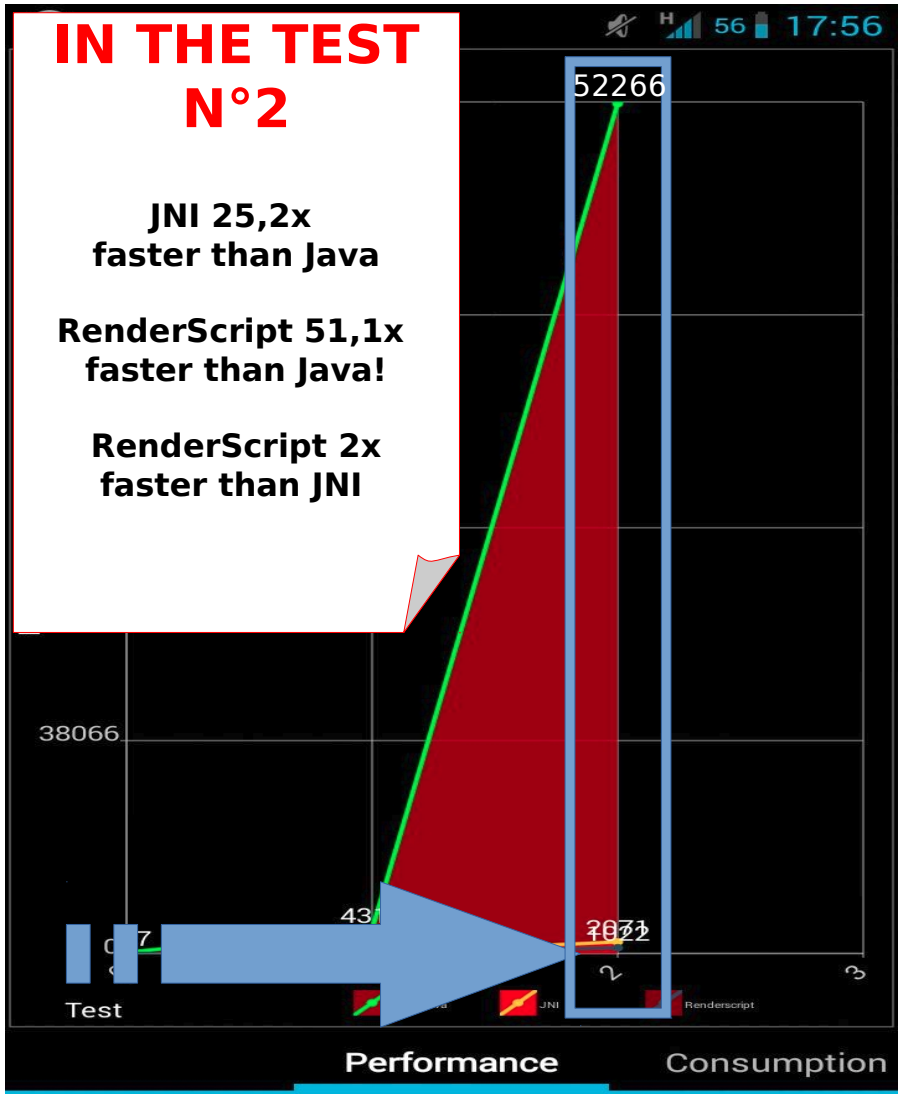


Discussion of local result (Bruteforce Performance)

LG L5

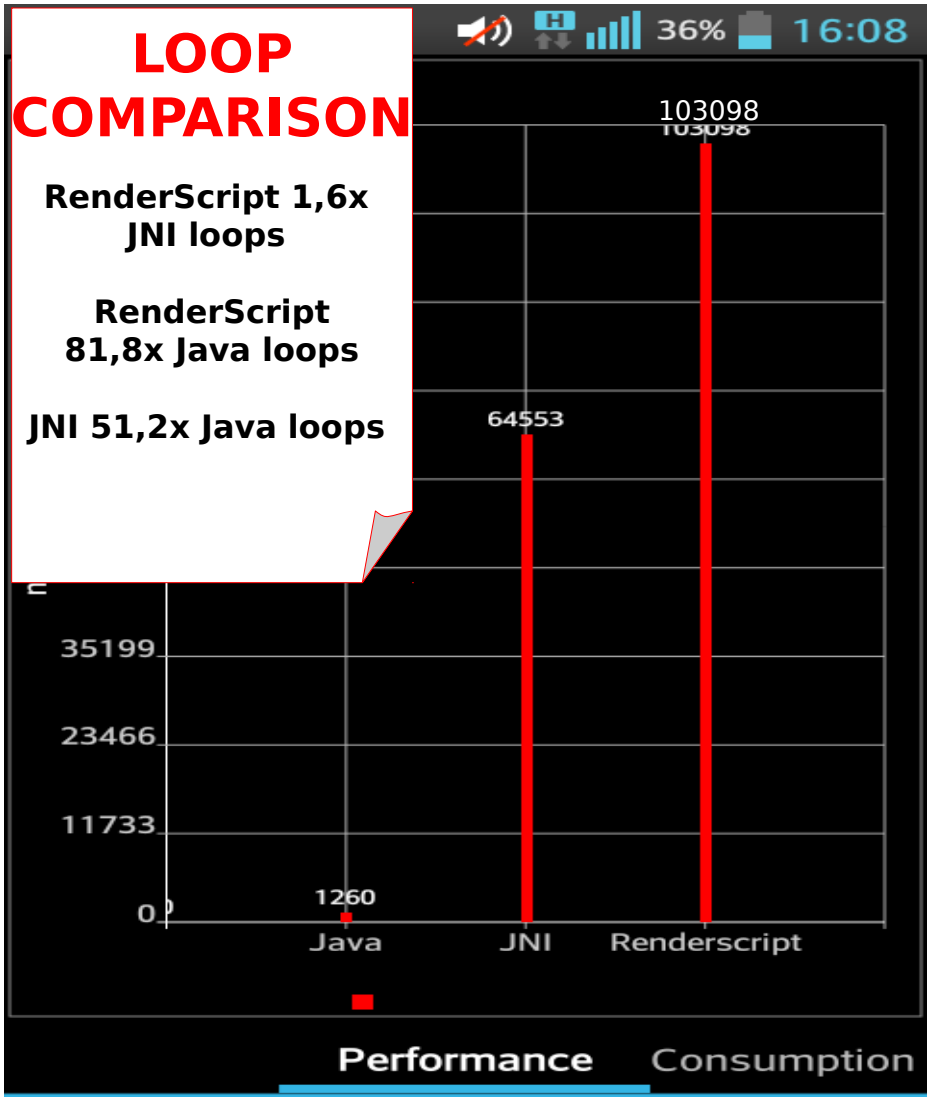


Galaxy SIII



Discussion of local result (Bruteforce loops untill lose of 1% battery)

LG L5



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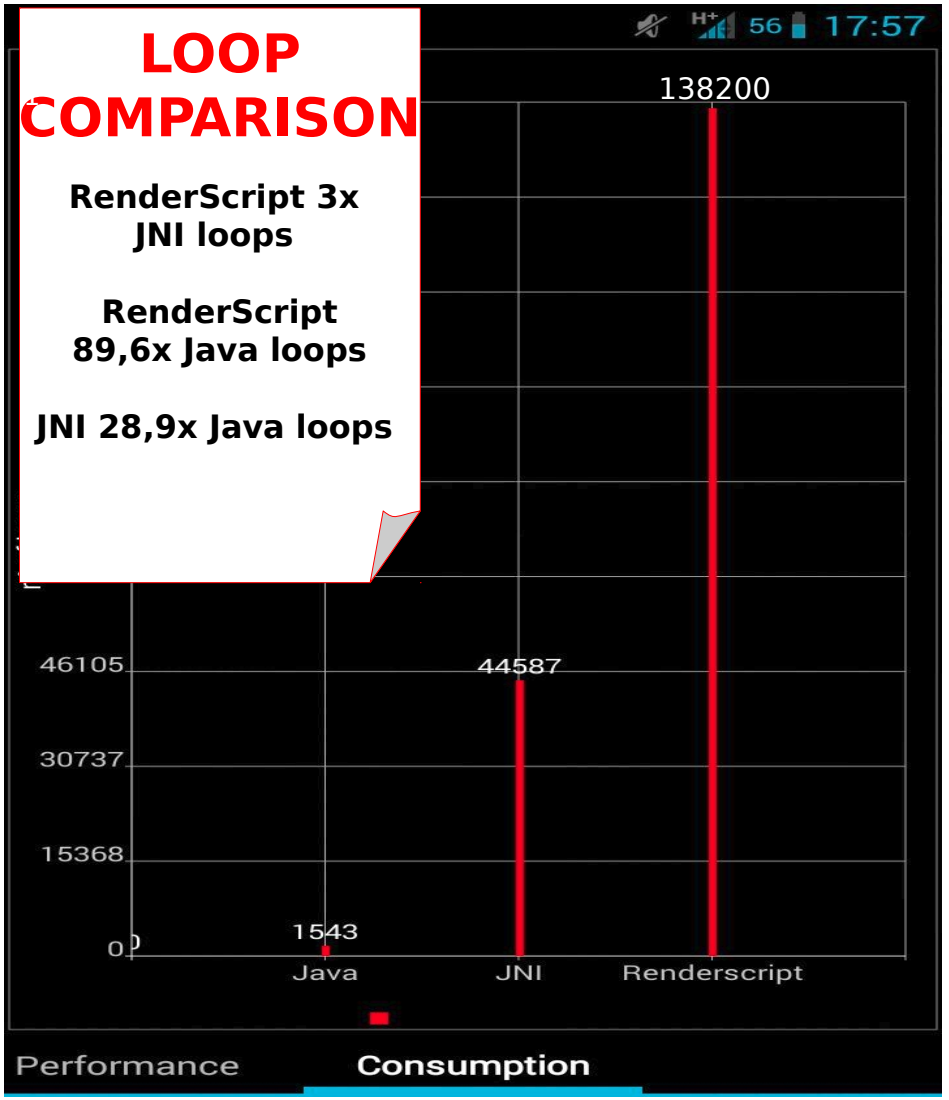
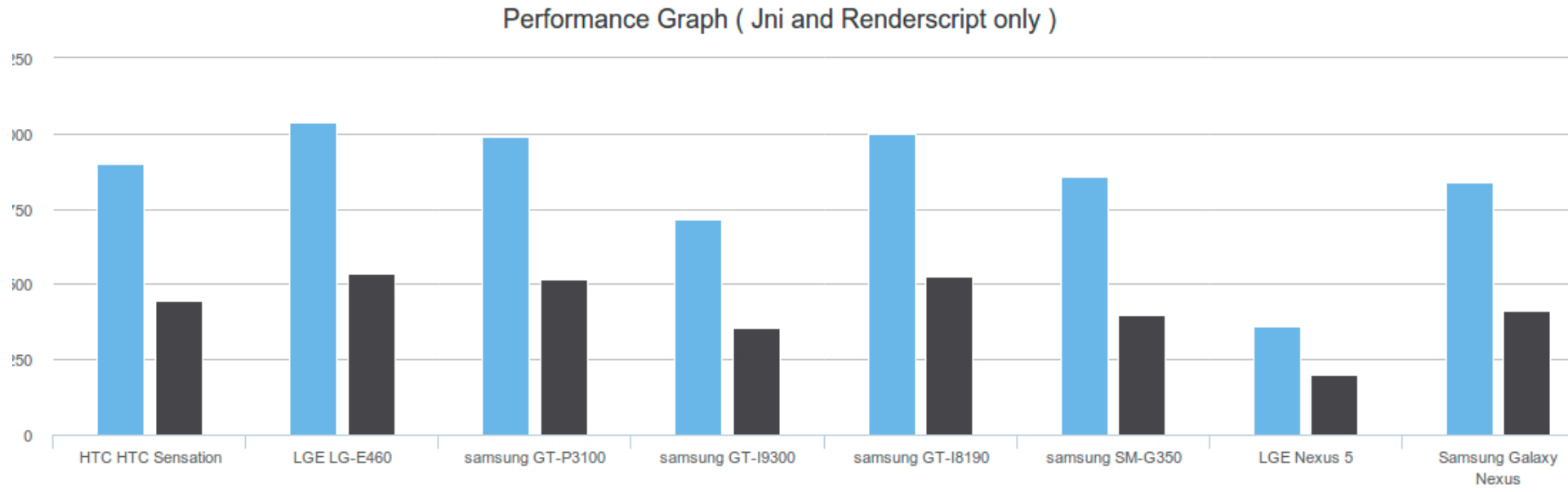
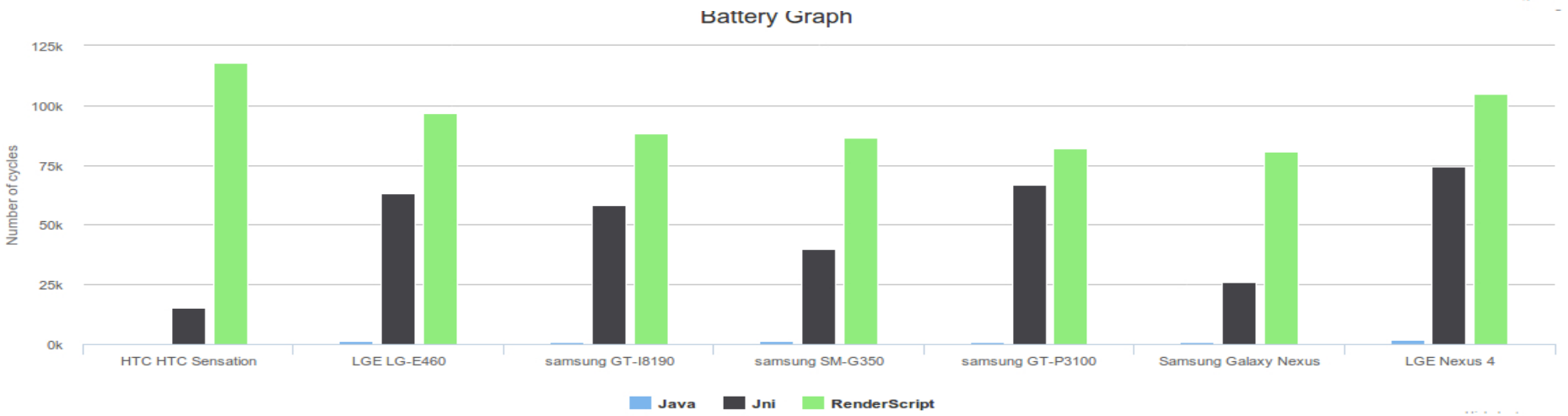


Discussion of global result (Bruteforce)





Conclusion

- Renderscript has a ***great power in speed up particoular tasks*** respect to Java
- According to global results obtained RenderScript tends to ***lose its benefit more slower*** than jni
- RenderScript seems that is able to ***mantain its performance*** on old devices and new one (with not so significantly difference in execution's time)
- RenderScript provide us a ***larger number of loops*** with a restricted battery's budget

In a future where the devices will be more complex and heterogeneous RenderScript can boost the performance of your app at no cost!

QUESTIONS?